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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,427	03/02/2004	Dan Shoham		2426

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EXAMINER
NEWTON, JARED W

ART UNIT	PAPER NUMBER
3693	

MAIL DATE	DELIVERY MODE
02/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/708,427	SHOHAM, DAN
	Examiner	Art Unit	
	JARED W. NEWTON	3693	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _02 March 2004_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-20_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _02 March 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities: the term "andgenerating" (lines 9-10) should be changed to --and generating--. Appropriate correction is required.

Claim 17 is objected to because of the following informalities: the term "andgenerating" (line 12) should be changed to --and generating--. Appropriate correction is required.

Claim 17 is further objected to because of the following informalities: the term "loan"s" should be replaced with --loan's--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 modifies the "performance metric" of claim 2, which is understood to mean a single performance metric. However, claim 3 further claims the metric as comprising two distinct measurements, rendering the claim indefinite. For purposes of examination, the claim has been interpreted to require the metric to comprise one metric or the other, but not both.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 7,191,150 to Shao et al. (hereafter Shao) in view of Saphir, *More than numbers*, Modern Health Care. Aug 21, 2000 (hereafter Saphir).

In regard to claim 1, Shao discloses a computer implemented method for determining a creditworthiness metric of a credit applicant (see e.g. claims 1 and 44), comprising the steps of: obtaining past data for processing by the computer (see col. 4, line 60 – col. 5, line 49); generating a predictive model with the processor from the past data (see col. 6, lines 23-32; col. 9, lines 43-48; see also col. 8, lines 3-15); storing a representation of the predictive model in the computer storage (see col. 7, lines 44-60); receiving current data for processing by the processor (see col. 8, lines 16-28); and generating a computer signal indicative of the creditworthiness of the current credit applicant, wherein the processor generates the computer signal by applying the current data to the stored model (see id.).

Shao does not disclose the past and current data comprising psychometric interviews data.

Saphir teaches a method for evaluating an entity's creditworthiness, wherein the creditworthiness is based on psychometric interviews data, including management savvy, responsiveness, integrity and other character attributes.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the psychometric data taught by Saphir as part of the generation of the predictive models and evaluation of creditworthiness as disclosed by Shao. Motivation for including psychometric data in a creditworthiness evaluation would be that as taught by Saphir—to gain a more accurate understanding of creditworthiness. Saphir recites, "All three ratings agencies seem to understand that subjective factors are as important, if not more important, than past historical financial ratios in trying to understand the future creditworthiness..."

In regard to claim 2, Shao further discloses the steps of: monitoring a performance metric of the model, wherein the processor monitors the performance metric; comparing the performance metric with a predetermined performance level; and generating and storing a new predictive model from past data responsive to the performance metric, wherein the new predictive model is generated by the processor and stored (see col. 8, line 62 - col. 9, line 48).

In regard to claim 3, *insomuch as understood in view of the 35 U.S.C. § 112 Rejections above*, Shao further discloses the metric comprising a measurement of a rate of non-performing loans (see col. 8, lines 29-61).

In regard to claim 4, it would be obvious in view of the combination of Shao and Saphir set forth above to combine past and current credit application-related data of

Shao (i.e. "traditional credit card account information" -- see col. 5, lines 6-12) with the psychometric data disclosed by Saphir, in order to carry out the method set forth above with respect to claim 1.

In regard to claim 5, the psychometric data disclosed by Saphir includes answers to a psychometric interview provided by at least one interviewee associated with the credit applicant. Saphir recites, "More than ever, management savvy, responsiveness and simple integrity can overshadow raw numbers in determining what credit rating a hospital gets, and, ultimately, what premium it pays to borrow money ... In the case of the managers who didn't provide market share numbers, 'It cost them a notch (in their rating). It was a fair question, and they said, 'Nah, we don't track that stuff.' I'm going, 'Not the right answer,' ' recalls Gordon Howie, a managing director at investment bank Paine Webber."

In regard to claim 6, the psychometric interview data disclosed by Saphir comprises answers to a psychometric interview provided by at least one interviewee associated with the credit applicant selected upon a pre-determined association relationship, such as lender and borrower.

In regard to claim 7, the psychometric interview data disclosed by Saphir further comprises the amount of time each interviewee took to answer questions. Saphir recites, " 'When we ask questions, if they can respond to us right away' that's a positive, says Standard & Poor's analyst Susan Hill."

In regard to claim 8, the psychometric interview data disclosed by Saphir further comprises answers provided by a plurality of interviewees ("management") associated with the credit applicant.

In regard to claim 9, the disclosure of Saphir contemplates interviewing both the Chief Executive Officer and the Chief Financial Officer. Saphir recites, "[I]t shouldn't always be the CFO who's responding." "Senior management," "executives" and "controllers" are also interviewed by the method of Saphir.

In regard to claim 10, the interviewees disclosed by Saphir are associated with a loan applicant.

In regard to claim 11, the interview questions asked by the method of Saphir are from a pool of questions.

In regard to claim 12, the applicant disclosed by Saphir is a business.

In regard to claim 13, Shao further discloses the creditworthiness metric including a representation of the likelihood of success of a contemplated business relationship (see col. 3, lines 23-29).

In regard to claim 14, the relationship is a loan (see col. 4, lines 28-38).

In regard to claim 15, the relationship disclosed by Saphir is an equity investment. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the system of Shao to determine a creditworthiness metric that includes a representation of the likelihood of success of a contemplated business relationship, wherein the relationship comprises an equity investment. Loans and equity

investments are known business relationships for which creditworthiness of a borrower or investee is determined prior to a commitment of capital.

In regard to claim 16, Shao further discloses combining current credit score data with creditworthiness indication generated by the disclosed model (see col. 10, lines 14-21).

In regard to claims 17-19, the limitation set forth are deemed unpatentable over the Shao reference in view of the Saphir reference as applied to claims 1-16 above.

In regard to claim 20, it would have been obvious to one of ordinary skill in the art at the time of the invention to conduct the method disclosed by Shao over the internet. It was well-known and common at the time of the invention to automate processes such as creditworthiness evaluations via the internet.

Claims 1-20 are further rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's specification in view of Saphir, *More than numbers*, Modern Health Care. Aug 21, 2000 (hereafter Saphir).

In regard to the claims, Applicant's disclosure sets forth the state of the art of creditworthiness determination at the time of the invention (see [0015]), including the use of statistical modeling (see [0022]-[0025]), including linear regression modeling, logistic regression modeling, neural network modeling (see [0025]), and model training (see [0026]-[0029]).

Applicant's disclosure does not disclose the utilization of psychometric data in the creditworthiness determinations known at the time of the invention.

However, Saphir teaches the method for evaluating an entity's creditworthiness as set forth above.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the psychometric data taught by Saphir as part of the generation of the predictive models and evaluation of creditworthiness as disclosed by Applicant's disclosure. Motivation for including psychometric data in a creditworthiness evaluation would be that as taught by Saphir—to gain a more accurate understanding of creditworthiness. Saphir recites, "All three ratings agencies seem to understand that subjective factors are as important, if not more important, than past historical financial ratios in trying to understand the future creditworthiness..."

With respect to the above rejections, the Examiner has cited particular portions of the reference(s), and although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that the Applicant consider each cited reference in its entirety as potentially teaching the limitations of the claimed invention.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- US Patent Application Publication No. 2003/0009418 to Green et al.

- US Patent Application Publication No. 2003/0120589 to Williams et al.

- US Patent Application Publication No. 2004/0044615 to Xue et al.

- US Patent Application Publication No. 2004/0107161 to Tanaka et al.

- US Patent Application Publication No. 2005/0278245 to Celati

- US Patent No. 3,316,395 to Lavin

- US Patent No. 6,029,149 to Dykstra et al.

- US Patent No.6,208,979 to Sinclair

- "Oscore Welcomes New Board Members, Holds Inaugural Board Meeting.' Market Wire. Oct 2003.

- Lee and Jung, "FORECASTING CREDITWORTHINESS: LOGISTIC VS. ARTIFICIAL NEURAL NET." The Journal of Business Forecasting Methods & Systems; Winter 1999/2000; pg. 28.

- Karlan, "Social Capital and Microfinance." Massachusetts Institute of Technology, 2002.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JARED W. NEWTON whose telephone number is (571)272-2952. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Kramer can be reached on (571) 272-6783. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A. Kramer/
Supervisory Patent Examiner, Art Unit 3693

JWN
February 1, 2008

		Application/Control No.	Applicant(s)/Patent Under Reexamination
Notice of References Cited		10/708,427	SHOHAM, DAN
		Examiner	Art Unit	Page 1 of 1
		JARED W. NEWTON	3693	

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-3,316,395 A	04-1967	LAVIN MICHAEL G	705/38
*	B	US-6,029,149 A	02-2000	Dykstra et al.	705/38
*	C	US-6,208,979 B1	03-2001	Sinclair, David A.	705/38
*	D	US-2003/0009418 A1	01-2003	Green et al.	705/38
*	E	US-2003/0120589 A1	06-2003	Williams et al.	705/38
*	F	US-2004/0044615 A1	03-2004	Xue et al.	705/038
*	G	US-2004/0107161 A1	06-2004	Tanaka et al.	705/038
*	H	US-2005/0278245 A1	12-2005	Celati, Luca	705/038
*	I	US-7,191,150 B1	03-2007	Shao et al.	705/38
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Saphir, More than numbers, Modern Health Care. Aug 21, 2000.
	V	"Oscore Welcomes New Board Members, Holds Inaugural Board Meeting.' Market Wire. Oct 2003.
	W	Lee and Jung, "FORECASTING CREDITWORTHINESS: LOGISTIC VS. ARTIFICIAL NEURAL NET." The Journal of Business Forecasting Methods & Systems; Winter 1999/2000; pg. 28.
	X	Karlan, "Social Capital and Microfinance." Massachusetts Institute of Technology, 2002.

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)   **Notice of References Cited**   Part of Paper No. 20080201

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Other available formats:

📖 Abstract

modern
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More than numbers

Ann Saphir. Modern Healthcare. Chicago: Aug 21, 2000. Vol. 30, Iss. 35; pg. 26, 2 pgs

Abstract (Summary)
While management has always made a difference in credit rating, analysts' assessments of executive character are taking on a new importance in the wake of changing market conditions and the financial collapse of Allegheny Health, Research and Education Foundation (AHERF). More than ever, management savvy, responsiveness and simple integrity can overshadow raw numbers in determining what credit rating a hospital gets and, ultimately, what premium it pays to borrow money. Tightening reimbursement, smaller profit margins, more regulations and stricter enforcement make it ever more important that the people behind the wheel of a healthcare organization really know what they are doing, credit-rating analysts say.

≫ Jump to indexing (document details)

Full Text (1948 words)

[Headnote]
Analysts assess executive character, financials to determine credit ratings

Here are two tales from the new world order of hospital credit rating:

A community hospital that has performed poorly in the past takes on new management and a new operating structure. Its debt is notched up to a respectable BB-.

Meanwhile, managers at another facility decline to furnish analysts with market-share information. The result is a lower rating.

While management has always made a difference in credit rating, analysts' assessments of executive character are taking on a new importance in the wake of changing market conditions and the financial collapse of Allegheny Health, Research and Education Foundation (AHERF). More than ever, management savvy, responsiveness and simple integrity can overshadow raw numbers in determining what credit rating a hospital gets and, ultimately, what premium it pays to borrow money.

"There is an element of wanting to look in the whites of the eyes of the folks who are making things happen for the system," says Duncan Gallagher, chief financial officer of Iowa Health System, Des Moines.

For example, in the case of the overhauled community hospital, which Craig Kornett, analyst at New York-based credit-rating agency Fitch, declines to name, "It's fairly likely that if we did not have a good feeling on management, (the rating) would be lower."

In the case of the managers who didn't provide market share numbers, "It cost them a notch (in their rating). It was a fair question, and they said, 'Nah, we don't track that stuff.' I'm going, 'Not the right answer,'" recalls Gordon Howie, a managing director at investment bank PaineWebber.

Tightening reimbursement, smaller profit margins, more regulations and stricter enforcement make it ever more important that the people behind the wheel of a healthcare organization really know what they are doing, credit-rating analysts say.

The 1998 bankruptcy of Pittsburgh-based AHERF also was a lesson in the importance of assessing the integrity of management and the quality of board oversight. Earlier this year, AHERF executives were arrested on charges of stealing endowment funds and sued for allegedly providing false financial information to buyers of the system's tax-exempt bonds.

Few would argue criminal activity by executives is endemic to the industry. But many point to the market decline in creditworthiness throughout the healthcare industry as evidence of tough times and the impact of bad management.

A July Moody's report projected that the amount of debt in the not-for-profit hospital industry downgraded this year could surpass the $13.4 billion downgraded in 1999. Driving the downgrades is the tight reimbursement environment, the report said. And in a growing number of cases, assessing management's ability to deal with that environment feeds directly into the decision whether to downgrade.

"It's more than the numbers. Otherwise, we don't need a team of 10 analysts (to do a rating)," says Lisa Goldstein, an analyst at Moody's Investors Service.

A case in point is Iowa Health, which in April issued $207 million in bonds rated A+ by Fitch and A1 by Moody's Investors Service.

Beyond cash flow and debt ratios, analysts look at "how the management team presents itself and interacts with the analysts while they are on-site," Iowa Health CFO Gallagher says.

In fact, he says, Iowa Health cash balances and operating margins aren't in line with the A1 rating category, and he

attributes the bump-up to management's abilities.

Moody's A-rated credits post a median operating profit margin of 1.8%, while Iowa Health generated a 0.2% profit in 1999. And in its analysis for the new bond issue, Moody's called the system's 80% cash-to-debt ratio "somewhat weak for an A1-rated credit."

"We believed we had to do a good job with telling our story, and we made a lot of effort," Gallagher says.

Part of Iowa Health's success lies in its openness, he says. "We heard strongly from analysts and the credit community that they would like to see a more open relationship with the management and would like the ability to interact directly with management on a periodic basis to share our financial performance." (See related story, p. 44.) So in what Iowa Health officials believe is a national first, the 10-hospital system has started posting its quarterly financials on its World Wide Web site.

"There was value in them feeling we were so open about it-it displays a confidence by management that we stand behind our numbers and that we are willing to explain on a quarter by quarter basis," Gallagher says.

Bill Bellenfant, CFO of Trinity Mother Frances Health System in Tyler, Texas, says that as profitability becomes harder to achieve, analysts look more to management for the answers.

"(Now) is the most significant credit tightening in my career, and the healthcare industry is beginning to have to pay a premium to get letters of credit, bond insurance is less available and (hospitals) have to pay a higher price than in the past. The future will determine whether this is an overreaction to AHERF, (the federal Balanced Budget Act of 1997), managed care and other (factors)," he says.

Trinity's $146 million debt is rated BBB by Fitch. "All three ratings agencies seem to understand that subjective factors are as important, if not more important, than past historical financial ratios in trying to understand the future creditworthiness of the organization," Bellenfant says.

Subjective factors are also of concern to the side that ultimately matters mostinvestors who buy and sell bonds.

Andy Matteis, director of tax-exempt research at ⊙Putnam Investments, Boston, which has $17 billion invested in tax-exempt bonds, says that investors in not-forprofits have always focused on management and markets more than their brethren investing in corporate healthcare, who tend to look exclusively at cash flow.

[Photograph]
"There is an element of wanting to look in the whites of the eyes of the folks who are making things happen for the system."
-Duncan Gallagher, CFO, Iowa Health System

"When you are looking at (performance) prospectively, you want to know

how good is management at reading the industry, how sophisticated are their information systems, do they have the market leverage to be a price-maker instead of a price-taker," he says.

But Matteis says that the numbers tell a major part of the story, and says that leaving out the numbers does a disservice to investors.

Analysts agree.

"Management has always been one of the factors that we look at,"

says Moody's analyst Goldstein. "But ultimately, if the strategies are working, then we should see a financial profile that works."

Goldstein agrees that times have changed. "Post AHERF, board members are taking their responsibilities much more seriously," she says. She tells the story of a board member who called up the hospital CEO after reading in the Wall Street Journal that Columbia/HCA Healthcare Corp. (now ©HCA-The Healthcare Co.) intended to sell a hospital the trustee thought might make a smart acquisition.

"Now that's taking their strategic and fiduciary responsibilities to heart," she says. Management matters more in some situations than in others. "In a rural market with limited managed-care pressures, management doesn't have to be as good," says Fitch's Kornett. "In that environment we look at the numbers because they are more stable."

In May, a Fitch report on municipal bond ratings put it this way: "Fitch has come to the conclusion that management practices are even more important to predicting favorable credit performance than had been appreciated in the past. In its future rating assignments, Fitch will place greater and more specific weight on management practices, both good and bad, that are employed by issuers in running their financial operations."

Much the same can be said of healthcare credits, Fitch analyst Jordan Melick says. Measuring management's abilities isn't

rocket science, he says. It isn't a good sign, for instance, when the top managers take analysts for a tour of the facility and nobody recognizes the managers. Analysts also try to see "how quickly

will a management team or a board committee decide to terminate a service that is not profitable," Goldstein says.

"When we ask questions, if they can respond to us right away" that's a positive, says Standard & Poor's analyst Susan Hill. And it shouldn't always be the CFO who's responding. "We definitely want to see some depth of management (able and willing to respond to inquiries)," she says.

Boards should also know what's happening. When asked what the biggest challenge for the hospital will be, Hill says it makes a big difference "if they say, 'Oh, we're getting an MRI,' or if they say, 'Managed care is coming into our area.'"

"As healthcare becomes a more difficult industry I think that boards will look for senior management that has the ability and capacity and background to handle the continuing challenges coming in rapid fire," Goldstein says. In some situations, even the

best management team probably isn't going to make the desired impression. In the past two years, ratings analysts have become particularly concerned about mergers.

"There was this case of a merger situation that had been in trouble for a while, and they gave us a plan in which they were going to take huge amounts of savings out of the combined organization-more than $50 million-and we notched that rating down because we felt it was an aggressive plan and a huge reach," says Standard & Poor's Hill of a credit she recently rated.

"We felt (management was) a little of the old school. The board of trustees there was not as business-minded and profit-oriented as other boards." But some say such skepticism might be overkill. "All the rating agencies assume the integration process is going to be a challenging one, and I think that's almost regardless of what management says. I think they've become big believers in Murphy's Law," says PaineWebber's Howie, who as an investment banker facilitates the bond-rating process for hospitals and healthcare systems.

Joan Payne, controller at Covenant Healthcare System in Saginaw, Mich., says she knew going into the rating process for her system that the Standard & Poor's analysts would want to assess management's ability to integrate St. Luke's Hospital and Saginaw General Hospital, which merged in 1998 to create Covenant.

She and management "talked about areas that they would ask questions on. We didn't do any scripting or preparing answers, (but we) wanted to have explanations ready."

Since Covenant had just issued bonds in 1999 and completed a full-scale visit then, this year's update took place over the phone, she says. Among other questions, the analysts asked "where we are heading and why do we think that we are able to survive," she says.

Apparently, management's answers were satisfactory: Covenant's $48 million June bond issue was rated A by Standard and Poor's.

PaineWebber's Howie says it's critical to stay in constant contact and be candid with analysts. "Nothing annoys ratings analysts more than to learn about one of their clients in MODERN HEALTHCARE." Despite the obvious importance of margins and ratios, in the end, the human factor counts for a lot.

"In some way you could say it's 100% of the rating because in some way the management affects everything: demand, services, how you deal with the reimbursement issues, what your capital spending and operating plans are. So indirectly, it affects everything else," says ⓤS&P's Hill. U

[Photograph]
"All three ratings agencies seem to undestand that subjective
factors are as important,
if not more important, than past historical financial ratios
in trying to understand the future creditworthiness of the
organization."
-Bill Bellenfant
CFO, Trinity Mother Frances Health System

[Photograph]
"We talked about areas that they would ask questions on. We didn't do any scripting or preparing answers, (but we) wanted to have explanations ready."
-Joan Payne

Controller, Covenant Heathcare System

Indexing (document details)

Subjects:	Hospitals, Credit ratings, Management, Business failures
Classification Codes	9190 United States, 8320 Health care industry, 3200 Credit management
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Companies:	Allegheny Health Education & Research Foundation (**NAICS:** 813212 , 622110 , **Sic:**8049 , 8060)
Author(s):	Ann Saphir
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Oscore Welcomes New Board Members, Holds Inaugural Board Meeting

<u>Market Wire</u>, <u>October, 2003</u>

Oscore, Inc., a leading developer of scoring technologies, today announced the inauguration of the Board of Director to include Todd Gutschow, retired co-founder of HNC Software; Christy Joiner-Congleton, president of Stone Analytics; and Dan Shoham and Michael Rozman, President and Vice President of Oscore, respectively. In the inaugural meeting, the Board approved Oscore's plans to market a revolutionary system of applying psychometric interviews to predict business borrowers' creditworthiness.

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Todd Gutschow retired from Fair Isaac Corporation in 2003. Prior to retiring, Mr. Gutschow spent sixteen years with HNC Software, a company he co-founded in 1986. HNC Software, a developer of neural network applications in banking, insurance, retailing and other industries, was acquired by Fair Isaac in 2002 for approximately $600 million. He holds a Bachelor degree in Physics from Harvard University.

Leveraging over twenty years' experience developing analytic business products, Christy Joiner-Congleton founded Stone Analytics in 1998. Previously, Ms. Joiner-Congleton was Vice President of Strategic Planning for Stone Capital, a venture capital firm located in Dallas, Texas. She holds a MS in Economics and was a Regents Fellow at UC, San Diego.

Prior to founding Oscore, Dan Shoham spent eight years with HNC Software in roles including Principal Scientist and Product Line Director. Previously, Dr. Shoham spent eight years as a Staff Scientist at the Massachusetts Institute of Technology Lincoln Laboratory Systems and Analysis Group. Studying Mathematics, at age 21, he was the youngest-ever person to be awarded a PhD by Temple University. He also holds an MBA from Columbia University and the London Business School.

Prior to joining Oscore, Michael Rozman spent nine years at JP Morgan Chase in roles including Vice President for Investor Services -- Common Custody Solutions, managing $3.5 billion in custody assets. He holds an MBA from Columbia University and the London Business School.

About Oscore, Inc.

Headquartered in San Diego, California, Oscore, Inc. utilizes advanced statistical, risk management, and organizational psychology techniques to create a risk score for companies. Oscore's Patent-pending Organization Score technology allows Oscore to assign a risk measurement (a score) that evaluates a company's creditworthiness, ability to continue operations as a going concern, and investment suitability.

For more information, visit the Oscore web page, www.oscore.com or call 888-OSCORE-0 (888-672-6730).

Michael Rozman 888-OSCORE-0 (888-672-6730)

FORECASTING CREDITWORTHINESS: LOGISTIC VS. ARTIFICIAL NEURAL NET

By   Timothy H. Lee and Sung-Chang Jung

Logistic regression forecasts of creditworthiness of urban customers are better than rural customers ... study is based on the master files of several credit unions in South Korea ... certain amount of judgment is used in both models, logistic and artificial neural net.

Looking at credit risk has been of major interest to credit grantors like banks and other commercial lending institutions over the last ten years. Today, the accurate assessment of risk is a must for credit card portfolio management. The Equal Credit Opportunity Act (Regulation B, 12 CFR 202), which prohibits credit discrimination, requires that every commercial lending institution develop an objective scoring system based on empirical data.

Let's say you're an independent consultant and some credit unions have hired you to help reduce costs associated with loan delinquency. If you could identify those customers who would go delinquent ahead of time, then the credit unions could set up stricter screening policies to prevent unnecessary bad debt. Predicting this type of payment behavior is usually done through what are called "scoring models." Scoring models generate scores (numeric measures) that indicate the level of credit risk acceptable in business decision making. Portfolio managers make decisions by first "scoring" their accounts and then determining if the score falls in an acceptable range. The objective is to develop a single measure reflecting the creditworthiness of the individual based upon a set of predictor information —

usually from their credit history.

Popular approaches for developing and scoring models include Logistic Regression Analysis, Linear Discriminant Function (LDF) Analysis, Linear Regression, and Artificial Neural Networks. Generally, Logistic Regression seems preferred to Ordinary Linear Regression. The study that follows highlights a comparison between a Logistic Regression scoring model and an Artificial Neural Net using credit union information from South Korea.

DATA

The data in this study was based on accounts taken from the master files of several credit unions in South Korea. A total of 14,452 accounts were used to estimate the models and 7,226 accounts were used to validate accuracy. The dependent variable in the model was coded as zero if the account was less than 90 days delinquent. These types of accounts are referred to as "good" accounts – paying their bills in a reasonable time period. If the

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Dr. Lee is Vice President of Knowledge Engineering's Science and Analytics Division at Equifax where he is responsible for setting up strategic objectives for model development. Prior to Equifax, he worked for Sears Payment Systems and TRW Information Services. He holds MS in Statistics from Stanford University and Ph.D. in Statistics from University of Northern Colorado.

SUNG-CHANG JUNG

Dr. Jung is an Associate Professor of Finance at Chonnam National University. He received his Ph.D. in Finance from Georgia State University and MBA from Seoul National University, Seoul, Korea. His research interest includes forecasting and planning. He is heavily involved in the application of neural networks to financial forecasting. He is on the board of director of a local bank.

payment behavior of the account was greater than 90 days, the dependent variable was coded as 1. These accounts are referred to as "bad" accounts. The followings were the variables used in both models:

L = Location of Credit Union
Urban = 0
Rural = 1
X_1 = Age
X_2 = Monthly Salary (unit: 1000,000 Won, U$ 1.00 = 1170 Won)
X_3 = Total Asset (unit: 1000,000 Won)
X_4 = Age of account
X_5 = Number of capital contributions (building equity or ownership in the credit union) in last one year
X_6 = Amount of capital contribution in last one year (in 1,000,000 Won)
X_7 = Amount of total capital contributed (building equity or ownership in the credit union) up to loan application (in 1,000,000 Won)
X_8 = Average balance of demand deposit and savings deposits during last 3 months
X_9 = Total amount of monthly regular savings (in 1,000,000 Won)
X_{10} = Number of days' delinquent
X_{11} = Number of insurance products purchased from the credit union

DATA PREPARATION

Analyzing this type of data usually requires a dataset with a mix of good and bad accounts different from the original population. This is because the modeling data has to have enough accounts of both "good" and "bad" so that they yield statistically valid estimates. For example, if the percentage of accounts 90+ days' delinquent (bad) is extremely low (say, ½ %), then we have to add more "bad" accounts to the data to make it statistically valid. Therefore, a stratified random sampling scheme was used to construct a robust dataset for model estimation. This type of sampling can yield bias estimates of the score. To avoid it, we used a simple correction procedure. For more information on this procedure, please see the reference by Lee and Searls.

TABLE 1
LOGISTIC REGRESSION VS. ANN

Evaluation Metrics	Logistic Regression	Urban ANN	Winner
KS Statistic	0.704	0.689	Logistic
Inform. Value	5.000	4.380	Logistic
CS	0.835	0.826	Logistic
Percentile	44.880	44.660	Logistic
		Rural	
KS Statistic	0.663	0.832	ANN
Inform. Value	3.310	8.710	ANN
CS	0.734	0.911	ANN
Percentile	35.920	41.650	ANN

The data was randomly divided into 2 groups — one for model estimation (Development data) and the other (Validation or "hold-out" data) to validate the model. This data was then used to estimate two different types of models to predict the likelihood that an individual would exhibit "bad" payment behavior.

MODEL 1:
LOGISTIC REGRESSION

A requirement for Logistic Regression is that the dependent variable has to be coded as a *zero* or a *one*. As a result, predictions may be interpreted as probabilities, ranging from 0 to 100%. In this study for example, a Logistic score of .80 means that the account has an 80% probability of exhibiting "bad" payment behavior. In addition, Logistic Regression has the added benefit of capturing non-linearities in the data, increasing accuracy and explanatory power.

Logistic regression models were built for each segment (urban and rural) using development samples and then tested for accuracy using the validation datasets.

MODEL 2:
ARTIFICIAL NEURAL NET
(ANN)

Next we applied Neural Net Back-Propagation as an alternative classifier to

the Logistic Regression approach. It is a widely used network for pattern classification, prediction, and signal processing. ANN is emerging as an attractive technique for solving the credit approval problems, target marketing, fraud detection, and two-group or multi-group classification problems.

The typical Back-propagation network structure always has an input layer, an output layer, and at least one output layer. Each layer is fully connected to succeeding layer. During learning, information is also propagated back through the network and used to update the connection weights. The feeding process of forward and backward of values continues so that the error between the output generated and the desired input is reduced. This iterative process is the training process and most software packages have this option. The process stops automatically depending on the criterion chosen by the model builder. In this study, we used Professional II/Plus of Neural Ware. The network design used was as follows:

Number of Processing
Elements (PEs) in
the input layer = 11
Number of PEs in the
output layer = 1
Number of hidden Layer = 1
Number of PEs in the
hidden layer = 7

Learning Rule = Delta Rule
Transfer function = Sigmoid function

RESULTS

Once the above models were estimated, comparison was made on the basis of the following four criteria:

1. Two Sample Kolmogorov-Smirnov Test Statistic
2. Information Value (measures the degree of separation)
3. Coefficient of Separation (a performance measure that takes into account the degree of separation and pattern)
4. Percentile Analysis (worst 20% in the score distribution)

For more information on the exact meaning of these statistics, please see the references at the end of the article. Simply put, higher is better. Models with larger accuracy measurements tend to be preferred. Although these statistics are useful, perhaps the most important indicator is how well the models correctly identify the "bad" accounts in the holdout sample. As seen in Table 1, both models for the urban category correctly identified about 45% of the bad accounts. However, for the rural segment, the logistic model identified only 36% of the bad accounts as opposed to the 42% from the Neural Net model.

The table shows that both models ANN and Logistic are very powerful for predicting delinquency. However, Logistic regression outperformed the Neural Net for the urban accounts, and the Neural Net model, for the rural accounts. Perhaps the reason why the Neural Net did a better prediction job for the rural accounts is because it handles better non-linearity. Also, it does not require any assumptions about population distributions such as normality and equal variances. Logistic Regression is fairly robust as it requires an assumption only in the functional form. Despite these, the final modeling choice should be Logistic. In general, classification models for predicting credit risk have many legal constraints which can be handled

more easily with a Logistic Model than Neural Net model. However, both types of models use a certain amount of judgment in the development process. For instance, in ANN, the determination of number of hidden layers, number of process elements (PE) in the hidden layers, selection of training rules and transfer functions are intuitively chosen. Since both approaches offer special insight into payment behavior, our future challenge may be to explore the optimal way of combining the two to enhance the forecasting accuracy. ■

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There also are situations in which managers must go back and forth between adjusting prices and making new sales forecasts. Consider resort hotels that have a fixed quantity of rooms. These hotels will regularly adjust prices to make their supply equal to their most up-to-date forecast of demand. For example, prices for hotel rooms to celebrate the year 2000 New Year's week are increasing rapidly as actual bookings and forecasted demand are increasing. Many managers working with a fixed supply may find themselves in similar circumstances. The airline industry also uses a complex model of price adjustment, actual bookings, and updated sales forecasts to maximize its revenues.■

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Social capital and microfinance

by _Karlan, Dean S._, Ph.D., **Massachusetts Institute of Technology**, 2002; AAT 0803950

This graduate work is not available for purchase.

Abstract (Summary)
Chapter one is titled "Social Capital and Group Banking." Lending to the poor is costly due to high screening, monitoring, and enforcement costs. Group lending advocates believe individuals are able to select **creditworthy** peers, monitor the use of loan proceeds, and enforce repayment better than an outside lending organization can by harnessing the social capital in small groups. Using data collected from FINCA-Peru, I exploit the randomness inherent in their formation of lending groups to identify the effect of social capital on group lending. I find that having more social capital results in higher repayment and higher savings. I also find suggestive evidence that in high social capital environments, group members are better able to distinguish between default due to moral hazard and default due to true negative personal shocks.

Chapter two is titled "Can Games Measure Social Capital and Predict Financial Decisions." Economic theory suggests that market failures arise when contracts are difficult to enforce or observe. Social capital can help to solve these failures. Measuring social capital has become a great challenge for social capital research. I examine whether **behavior** in a trust game predicts future financial **behavior**. I find that trustworthy **behavior** in the game predicts higher loan repayment and savings deposits, whereas more trusting **behavior** predicts the opposite. Analyzing General Social Survey responses to questions on trust, fairness and helping others, I find that those with more positive attitudes towards others are more likely to repay their loan.

Chapter three is titled "When Curiosity Kills Profits: An Experimental Examination." Economic theory predicts that under Bertrand competition, with equal and observable costs, firms earn zero profits. Theory also predicts that if costs are not common knowledge, firms should use their weakly dominant strategy of pricing above marginal cost and earn positive profits. Hence, rational profit-maximizing Bertrand firms should prefer less public information. In an auction game, we find that individuals without information on each other's valuations earn more profits than those with common knowledge. Then, given a choice between the two rules, half the individuals preferred to have the information. We discuss possible explanations, including ambiguity aversion. (Copies available exclusively from MIT Libraries, Rm. 14-0551, Cambridge, MA 02139-4307. Ph. 617-253-5668; Fax 617-253-1690.)

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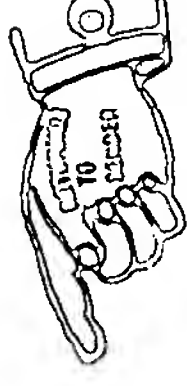
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